

**IN THE CLAIMS:**

1. (Currently amended) A cooktop, comprising ~~one or more a gas burner, burners, one or more a dual function gas valve valves, each of said valves being connected to control gas flow to one of said gas burners; a user interface for user entry of burner heating level for each of said one or more gas burners, a an electronic controller operative to control each of said one or more gas valves in accordance with said user entry entered for the corresponding one of said one or more gas valves, one or more igniters, each of said one or more igniters being connected to ensure ignition of the gas delivered to said gas burners; and one or more temperature an igniter, and a flame sensor, sensors, each of said sensors connected and placed to monitor the presence of flames at each of the said burners; wherein said electronic controller is connected to said dual function gas valve to control gas flow to said gas burner, wherein said user interface is for user entry of burner heating level for said gas burner, wherein said electronic controller is operative to control said dual function gas valve in accordance with said user entry, wherein said igniter is connected to ensure ignition of gas delivered to said gas burner, wherein said flame sensor is connected and placed to monitor for presence of flames at said gas burner, wherein said the cooktop being characterized in being dual function gas valve includes a first mechanism to operate adapted to operate alternatively in either of a first electronically controlled mode and a second mechanism to operate in a second electronically controlled mode, modes; said first mode having providing a continuous flame modulation at said gas burner varying continuously between modulated to a predetermined lower first heating level and or to a predetermined higher second heating levels level, and said second mode having providing intermittent flame at said gas burner for producing heating levels less than said lower first heating level for simmering operation; said intermittent flame being controlled between on and off states by said one or more gas valves, said gas valves being controlled by a pulse-width modulated electrical signal provided by said controller in accordance with said user entry.~~

2. (original) A cooktop as in claim 1, wherein said user interface comprises one or more touch-sensitive pads.
3. (Currently amended) A cooktop as in claim 1, further comprising a plurality of gas burners, one said dual function gas valve for each said gas burner, wherein each of said gas valves ~~comprises~~ includes a proportionally controlled solenoid-operated modulating gas valve, wherein no gas flow condition is measured in its fully closed position.
4. (Currently amended) A cooktop as in claim 3, wherein each of said dual function gas valves comprises a proportionally controlled solenoid-operated modulating gas valve wherein maximum gas flow is measured in its fully open position.
5. (Currently amended) A cooktop as in claim 4, wherein each of said dual function gas valves is also capable of providing any intermediate controlled position.
6. (original) A cooktop as in claim 1, wherein said user interface comprises a multiplicity of touch-sensitive pads operable to select burner heating levels in a predetermined set of user-selectable steps.
7. (Currently amended) A cooktop as in claim 6, wherein a lowest portion of said user-selectable steps corresponds to a flame "on/off" sequencing mode of flow settings of said dual function gas valves valve.
8. (Currently amended) A cooktop as in claim 6, wherein a highest portion of said user-selectable steps corresponds to a continuous flame modulation mode of flow settings of said dual function gas ~~valves~~ valve.

9. (Currently amended) A cooktop as in claim 6, wherein ~~said~~ each of said user-selectable steps corresponds to one of a multiplicity of flow settings of said dual function gas valves valve in a predetermined range ~~of flow settings~~.
10. (Previously presented) A cooktop as in claim 2, wherein said user interface further comprises a visual interface including a display selected from the list consisting of:
  - a) seven-segment LED displays;
  - b) discrete LED displays;
  - c) bar-graph LED displays;
  - d) LCD displays;
  - e) vacuum fluorescent displays; and
  - f) field-emission displays.

11. (Previously presented) A cooktop as in claim 2, wherein said user interface further comprises an audible interface including an annunciator selected from the list consisting of:

- a) an external drive piezo-acoustic element;
- b) a built-in drive piezo-acoustic element;
- c) an external drive magnetic transducer;
- d) a built-in drive magnetic transducer;
- e) an external drive speaker; and
- f) a built-in drive speaker.

12. (original) A cooktop as in claim 1, wherein said igniter comprises a resistive hot-surface igniter.

13. (Currently amended) A cooktop, comprising:

- a) ~~one or more~~ a gas burner ~~burners~~;
- b) ~~one or more~~ a dual function gas valve ~~valves~~, ~~each of said valves being~~ connected to control gas flow to ~~one of~~ said gas burner ~~burners~~ wherein said dual function gas valve includes a first mechanism to operate in a first electronically controlled mode and a second mechanism to operate in a second electronically controlled mode, said first mode providing a continuous flame at said gas burner modulated to a predetermined lower first heating level or to a higher second heating level, and said second mode providing intermittent flame at said gas burner for producing heating levels less than said lower first heating level for simmering operation;
- c) a user interface for user entry of burner heating level for ~~each of said one or more~~ gas burner ~~burners~~, wherein said user interface comprises a multiplicity of touch-sensitive pads operable to select burner heating levels in a predetermined set of user-selectable steps and wherein a lowest portion of burner heating levels corresponds to a flame "on/off" sequencing mode of flow settings of said ~~one or more~~ dual function gas valve ~~valves~~;
- d) a controller operative to control ~~each of said one or more~~ dual function gas valve ~~valves~~ in accordance with said user entry ~~entered for the corresponding one of said one or more gas valves~~;
- e) ~~one or more igniters, each of said igniters being~~ an igniter connected to ensure ignition of the gas delivered to ~~the~~ said gas burner ~~burners~~; and

- f) ~~one or more temperature~~ a flame sensor ~~sensors, each of said sensors being~~  
connected and placed to monitor the presence of flames at ~~each of the said~~  
gas burner ~~burners~~.

14. Canceled

15. (Currently amended) A cooktop as in claim 13, wherein ~~each of~~ said gas valve ~~valves~~  
comprises a proportionally controlled solenoid-operated modulating gas valve  
wherein no gas flow condition is measured in its fully closed position.

16. (Currently amended) A cooktop as in claim 13, wherein ~~each of~~ said gas valve ~~valves~~  
comprises a proportionally controlled solenoid-operated modulating gas valve  
wherein maximum gas flow is measured in its fully open position.

17. (Currently amended) A cooktop as in either of claims 15 and 16, wherein ~~each of~~  
said gas valve ~~valves~~ comprises a proportionally controlled solenoid-operated  
modulating gas valve is also capable of providing any intermediate controlled  
position.

18. Canceled

19. Canceled

20. (Currently amended) A cooktop as in claim 13, wherein a highest portion of said  
user-selectable steps corresponds to a continuous flame modulation mode of flow  
~~setting settings~~ of said dual function ~~gas valves~~ valve.

21. (Currently amended) A cooktop as in claim 13, wherein each of said user-selectable  
steps corresponds to one of a multiplicity of flow settings of said dual function ~~gas~~  
~~valves~~ valve in a predetermined range ~~of flow settings~~.

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22. (Previously presented) A cooktop as in claim 13, wherein said user interface further comprises a visual interface including a display selected from the list consisting of:
- a) seven-segment LED displays;
  - b) discrete LED displays[.];
  - c) bar-graph LED displays;
  - d) LCD displays;
  - e) vacuum fluorescent displays; and
  - f) field-emission displays.
23. (Previously presented) A cooktop as in claim 13, wherein said user interface further comprises an audible interface including an annunciator selected from the list consisting of:
- a) an external drive piezo-acoustic element;
  - b) a built-in drive piezo-acoustic element;
  - c) an external drive magnetic transducer;
  - d) a built-in drive magnetic transducer;
  - e) an external drive speaker; and
  - f) a built-in drive speaker.
24. (original) A cooktop as in claim 13, wherein said igniter comprises a resistive hot-surface igniter.

25. (Currently amended) A heating device, comprising:

a gas burner;

a single dual function valve including both a first electronically controlled mechanism and a second electronically controlled mechanism within said single dual function valve, said single dual function valve connected to provide gas to said gas burner;

an electronic controller for electronically controlling a said first electronically controlled mechanism and a said second electronically controlled mechanism;

said first electronically controlled mechanism ~~for controlling flow of gas to said burner;~~ capable of providing at least two different on-levels of continuous gas flow to said gas burner; and

said second electronically controlled mechanism ~~for controlling flow of gas to said burner;~~ capable of stopping and starting flow of gas to said gas burner, wherein combination of said first electronically controlled mechanism and said second electronically controlled mechanism provides capability to achieve a lower temperature than is achievable with just continuous flow of gas from said first electronically controlled mechanism.

26. (Previously presented) A heating device as recited in claim 25, wherein said first electronically controlled mechanism is capable of providing 30 different on-levels of gas flow.



27. (Currently amended) A heating device as recited in claim 25, wherein ~~a flame is produced at said gas burner~~ is capable of providing a flame, wherein said electronic controller is capable of controlling said second mechanism for sequencing the flame on and off at a predetermined level of flame.
28. (Previously presented) A heating device as recited in claim 27, wherein said controller comprises a microcontroller, wherein sequencing the flame on and off is controlled by said microcontroller.
29. (Previously presented) A heating device as recited in claim 28, wherein said microcontroller further comprises a pulse width modulation output port and an A/D converter.
30. (Previously presented) A heating device as recited in claim 27, wherein sequencing the flame on and off is controlled by time.
31. (Previously presented) A heating device as recited in claim 27, wherein sequencing the flame on and off is accomplished with the on level set to a predetermined medium level of flame or with the on level set to a medium-low level of BTU output.
32. (Previously presented) A heating device as recited in claim 27, wherein sequencing the flame on and off is accomplished with gas flow on and off for time periods to correspond to a desired simmer level.
33. (Previously presented) A heating device as recited in claim 25, wherein said controller uses pulse-width-modulation for controlling said first mechanism.
34. (Currently amended) A heating device as recited in claim 25, further comprising an igniter, wherein said igniter assures flame re-ignition of said gas when said second mechanism is used.

35. (Currently amended) A heating device as recited in claim 34, wherein said igniter does not need to be synchronized with ~~flame~~ on/off cycling of said flow of gas during simmer mode
36. (Previously presented) A heating device as recited in claim 35, wherein said igniter is continuously powered when said second mechanism is used.
37. (Previously presented) A heating device as recited in claim 34, wherein said igniter comprises a resistive hot-surface igniter.
38. (Previously presented) A heating device as recited in claim 37, wherein said igniter comprises a ceramic hot-surface igniter capable of constant re-ignition
39. (Previously presented) A heating device as recited in claim 25, further comprising a main in-line solenoid safety valve.
40. (Currently amended) A heating device as recited in claim 25, further comprising a plurality of gas burners and a plurality of said dual function valves, wherein each of said plurality of gas burners has one of said plurality of dual function valves connected to provide gas ~~wherein said device comprises one of said first electronically controlled mechanisms and one of said second electronically controlled mechanisms for each said burner.~~
41. (Previously presented) A heating device as recited in claim 25, wherein said first mechanism comprises a variable orifice solenoid that has a plurality of positions controlled by application of a voltage signal.
42. Cancel

43. (Previously presented) A heating device as recited in claim 25, further comprising an igniter for igniting gas when said first electronically controlled mechanism provides flow of gas.
44. (Currently amended) A heating device as recited in claim 43, wherein said igniter is a ~~hot-surface~~ hot-surface igniter.
45. (Previously presented) A heating device as recited in claim 43, further comprising an igniter for igniting gas when said first electronically controlled mechanism and said second electronically controlled mechanism provides flow of gas.
46. (Currently amended) A heating device as recited in claim 45, wherein said igniter is set to be on continuously when said second electronically controlled mechanism is being used to stop and start flow of gas to said gas burner.
47. (Currently amended) A heating device as recited in claim 43, further comprising a circuit to monitor ignition, said circuit including a sensor for by sensing at least one from the group consisting of ~~temperature or sensing~~ flame and current flowing in said igniter.
48. (Previously presented) A heating device as recited in claim 25, further comprising a user interface.
49. (Previously presented) A heating device as recited in claim 48, wherein said user interface comprises a dial control.
50. (Previously presented) A heating device as recited in claim 48, wherein said user interface comprises touch switches.

51. (Previously presented) A heating device as recited in claim 50, wherein said touch switches comprises a touch pad.
52. (Previously presented) A heating device as recited in claim 48, wherein said user interface comprises a capacitive touch keyboard.
53. (Previously presented) A heating device as recited in claim 48, wherein said user interface comprises a power key, an on key, power level control keys, and an off key.
54. (Currently amended) A heating device as recited in claim 25, further comprising a digital visual display of cooking level of each said gas burner.
55. (Previously presented) A heating device as recited in claim 54, wherein said digital visual display comprises an LED, LCD, or a vacuum fluorescent display
56. (Currently amended) A heating device as recited in claim 25, further comprising a temperature burner base and a flame sensor fixed to a said burner base.
57. (Currently amended) A heating device as recited in claim 56, further comprising an igniter and a circuit to detect current flowing in said igniter, wherein if no current flows in said igniter during an ignition period or no elevated temperature flame is sensed ~~with said temperature sensor~~ then visual and audible alarms are generated.
- 58-60 canceled
61. (Previously presented) A heating device as recited in claim 25, further comprising a main in-line valve for closing off flow if a fault condition occurs.
62. (Previously presented) A heating device as recited in claim 61, further comprising an igniter, wherein said igniter is de-energized if a fault condition occurs.

63. (Previously presented) A cooktop as in claim 13, further comprising a main in-line solenoid safety valve.

67. (Previously presented) A device as recited in claim 65, wherein said first electronically controlled mechanism is capable of providing 30 different on-levels of gas flow.
68. (Previously presented) A device as recited in claim 65, wherein said electronic controller is capable of controlling said second mechanism for sequencing flow on and off at a predetermined level.
69. (Previously presented) A device as recited in claim 68, wherein said controller comprises a microcontroller, wherein sequencing fluid flow on and off is controlled by said microcontroller.
70. (Previously presented) A device as recited in claim 69, wherein said microcontroller further comprises a pulse width modulation output port and an A/D converter.
71. (Previously presented) A device as recited in claim 68, wherein sequencing the flow on and off is controlled by time.
72. (Previously presented) A device as recited in claim 68, wherein sequencing the flow on and off is accomplished with the on level set to a medium-low level.
73. (Previously presented) A device as recited in claim 68, wherein sequencing the flow on and off is accomplished with gas flow on for 1 second and off for 8 seconds.
74. (Previously presented) A device as recited in claim 64, wherein said controller uses pulse-width-modulation for controlling said first mechanism.
75. (Previously presented) A device as recited in claim 64, further comprising a main in-line solenoid safety valve.

76. (Previously presented) A device as recited in claim 64, wherein said first mechanism comprises a variable orifice solenoid that has a plurality of positions controlled by application of a voltage signal.
77. (Previously presented) A device as recited in claim 64, wherein said fluid comprises gas and wherein a single gas valve includes both said first electronically controlled mechanism and said second electronically controlled mechanism.
78. (Previously presented) A device as recited in claim 64, further comprising a user interface.
79. (Previously presented) A device as recited in claim 78, wherein said user interface comprises a dial control.
80. (Previously presented) A device as recited in claim 78, wherein said user interface comprises touch switches.
81. (Previously presented) A device as recited in claim 80, wherein said touch switches comprises a touch pad.
82. (Previously presented) A device as recited in claim 78, wherein said user interface comprises a capacitive touch keyboard.
83. (Previously presented) A device as recited in claim 78, wherein said user interface comprises a power key, an on key, power level control keys, and an off key.
84. (Previously presented) A device as recited in claim 64, further comprising a digital visual display of flow.

85. (Previously presented) A device as recited in claim 84, wherein said digital visual display comprises an LED, LCD, or a vacuum fluorescent display